

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Specification Amendments

Page 3 of the specification has been amended to correct two typographical errors, thus rendering moot the Examiner's objection to the disclosure.

Claim Amendments

Claims 1, 8 and 9 have been amended to remove the preferred embodiments. The preferred embodiments of claims 8 and 9 are now recited in new claims 15 and 16, respectively.

Minor changes have been made to the claims, in order to better comply with U.S. practice.

Claim of Priority

The Examiner has acknowledged the claim for foreign priority and receipt of the foreign priority document. However, there is no claim for foreign priority in the present application. Additionally, the Image File Wrapper for this application does not include a certified copy of a foreign priority application. Acknowledgement of such is respectfully requested.

Claim Objection

The objection to claim 8 has been rendered moot by the claim amendment.

Rejection Under 35 U.S.C. § 112, Second Paragraph

The rejection of claims 1-9 and 14 as being indefinite under 35 U.S.C. § 112, second paragraph has been rendered moot by the claim amendments.

Patentability Arguments

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

The present invention is a simple, efficient and cost effective method for reducing the caking tendency, dust formation and foaming tendency of urea granules. This is obtained by simply contacting the urea granule surface with a dilute solution of a specific compound followed by drying the granules. The compound, which is a carboxylic acid, reacts with the urea on the surface and causes a re-crystallisation of the surface layer of the granule. There is no deposition/formation of a shell etc. on the granules. Rather, the invention gives a re-crystallisation effect.

The caking and dust formation in urea granules are believed to be linked to migration of water between the urea granules. The solution to this problem according to this invention is to apply a compound containing at least one carboxyl group, which may be represented by the general formula XY-Z-COOH, where X and Y are hydrogen or a polar functional group, and where Z is a hydrocarbon group containing 1-25 carbon atoms.

The effect of the carboxyl containing compound is believed to be due to its strong affinity for water, and therefore it will provide a re-crystallisation effect on the surface of the granules forming a protective surface layer of urea-carboxylic acid (which is believed to contribute to the reduction of foaming).

The effect of the X and Y-groups of the invention is mainly to ensure that the polar character of the compound (due to the carboxylic group) is maintained when the Z-group becomes large (hydrocarbons have small dipole moments, and thus weak water affinity). The actual choice of polar functional group for X and Y is not critical; and thus, most polar groups may be employed. A main effect of the invention is due to the use of a specific class carboxyl containing compound on the surface of the granules.

Further, the role of the solvent is to dissolve the compound XY-Z-COOH and form a solution of the compound, such that it may be applied onto the surface of the urea granules. Thereafter, the solvent is vaporized from the granules, such that the solvent has no effect on the performance of the compound. That is, the solvent has no significant influence on the effect of

the invention. Any solvent may be employed as long as it is able to dissolve XY-Z-COOH. It is basic knowledge in chemistry that in order to dissolve a polar compound, you need a polar solvent. Thus, a skilled person in the art will understand that the choice of solvent is unimportant, as long as the solvent is able to solve XY-Z-COOH, which means use of a polar solvent.

Rejection Under 35 U.S.C. § 102(b)

Claims 1-8 and 10-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nabiev et al. (SU 806661). This rejection is respectfully traversed.

The Examiner takes the position that the Nabiev et al. reference teaches a method of treating mineral fertilizers to eliminate caking, wherein the treatment *allegedly* uses 5-30% of an acid, wherein urea is heated with the acid, and wherein the fertilizer is dried.

The Nabiev et al. reference describes a method for producing non-caking fertilizers. The objective of the invention is to improve the strength of the fertilizer granules and of the hygroscopic point and also introduce trace elements into the fertilizer.

This objective is obtained by a combined treatment of the fertilizer granules by an ammonium complex of copper, zinc, cobalt, or nickel and an acid which may be nitric, sulphuric, phosphoric, oxalic, or succinic acid. The amount of added ammonium complexes is from 5 to 30 weight% based on the weight of the fertilizer. Thus, contrary to the Examiner's assertion, this does **not** refer to the added amount of acid. See lines 14–18 on page 2 of the English translation of the reference.

Moreover, the discussion of the examples shown in the document discloses that the method results in a coating of ammonium complexes on the fertilizer granules. See line 4 on page 3 of the English translation. Also, the examples show three embodiments with urea granules, which have been treated with the ammonia complexes and a strong acid such as sulphuric, nitric or oxalic acid.

The present invention teaches causing a re-crystallisation of the surface of urea granules by a reaction with a dilute solution of a specific class of carboxylic acids in order to obtain improved caking tendencies and mechanical strength of the granules. On the contrary, Nabiev et

al. teaches forming a coating of ammonium complexes and treatment with an acid to obtain the same effect. These are clearly *two distinct solutions* to the same problem.

Therefore, the subject matter of claims 1-8 and 10-14 is clearly patentable over the cited reference, and withdrawal of the above-rejection is respectfully requested.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-5 and 8-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Snartland et al. (WO 99/15480). This rejection is respectfully traversed.

The Examiner takes the position that the Snartland et al. reference relates to a method for coating particulated fertilizers, i.e., urea to reduce dust formation and caking during handling and storage; wherein the method comprises applying an aqueous solution of a mineral acid, such as citric acid. The Examiner asserts that Snartland et al. further disclose citric acid used at 1.0%, and that the fertilizer particles are heated to 30°C prior to the coating operation. The Examiner takes the position that it would have been obvious to select various combinations of various disclosed ingredients such as the urea and the citric acid from within the teachings of the reference to arrive at compositions yielding no more than one would expect from such an arrangement.

The Snartland et al. reference describes formation of a nutrient containing shell of a solid metal salt or a mixture of salts on particulate fertilisers. The shell is made by first treating the fertiliser particles with an acid and thereafter with a mineral base. The document teaches (in the last paragraph on page 6) that it is not sufficient to only apply the mineral acid on the fertiliser granules, but it is also necessary to include a mineral base to form a protective salt shell on the particles at a weight ratio between mineral acid and mineral base between 1.0 and 1.5.

As discussed above, the present invention teaches forming a re-crystallisation of the urea granule surface, while Snartland et al. teaches forming a mineral shell on the granules. Thus, it is evident that the present invention is distinct from the reference, in that a *different function* is employed to solve the same problem.

Accordingly, the Examiner has inappropriately applied the cited case law, because the features of the present invention *are not a simple rearrangement of old elements* with each performing the same function. There are no clues in the cited prior art that it is possible to obtain

a similar effect as obtained by the shell of Snartland et al. by using only a dilute solution of a specific type of acid. On the contrary, page 6, lines 8-12 of Snartland et al. explicitly teaches that the best effect is obtained when the amounts (based on weight) of mineral acid and mineral base are approximately equal.

For the reasons set forth above, the invention of Applicants' claims is clearly patentable over the cited reference, and withdrawal of the rejection is respectfully requested.

Conclusion

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of objection and rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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